Special Meeting, September 5.

Present, twenty-eight members.

Dr. FRANKLIN BACHE, Vice-President, in the Chair.

The Vice-President announced that the meeting had been
called in consequence of certain legal proceedings taken against
the Society.

On motion, the subject was referred to a Committee, con-
sisting of Messrs. T. I. Wharton, Mr. Williams, Mr. Kane,
Mr. C. C. Biddle, and Mr. Vanderkemp, who were authorized
to take such steps as might seem to them conducive to the in-
terests of the Society.

Stated Meeting, September 19.

Present, thirty members.

Dr. FRANKLIN BACHE, Vice-President, in the Chair.

Letters were announced and read:—

From the Royal Astronomical Society, dated London, 4th
June, 1845: the Royal Asiatic Society, dated London, 19th
April, 1845: the Linnæan Society, dated London, 4th June,
1845: respectively acknowledging the receipt of Vol. IV.
Nos. 30, 31, of the Proceedings, and of Dr. Dunglison's Ad-
dress in Commemoration of Mr. Du Ponceau: and,—

From Dr. Beck, of Albany, dated Albany, 12th September, 1845, expressing a desire to procure for the Library of the State of New York, certain missing numbers of the first volume of the Proceedings of the Society.

The following donations were announced:—

Monthly Notices of the Royal Astronomical Society of London. Vol. VI. Nos. 12 to 17, inclusive. Jan. 10 to June 13, 1845. 8vo.—*From the Society.*

Transactions of the Geological Society of London. Second Series. Vol. VII. Parts 1 and 2. 1845. 4to.—*From the Society.*

Proceedings of the Geological Society of London. Session 1844, 1845. Vol. IV. Part 2. No. 101. 8vo.—*From the same.*

The Journal of the Royal Geographical Society of London. Vol. XV. Part 1. 1845. 8vo.—*From the Society.*

The Journal of the Royal Asiatic Society of Great Britain and Ireland. No. XVI. Part 1. London, 1845. 8vo.—*From the Society.*

Transactions of the Royal Society of Edinburgh. Vol. XVI. Part 1. 1845. 4to. Vol. XVII. Part 1, containing the Makerstoun Magnetical and Meteorological Observations for 1841 and 1842. 1845. 4to.—*From the Society.*

Proceedings of the Royal Society of Edinburgh. Vol. II. 1844-5. Nos. 25 and 26. Title, Contents and Index of Vol. I. 8vo.—*From the same.*

The Transactions of the Royal Irish Academy. Vol. XX. Dublin, 1845. 4to.—*From the Academy.*

Reports of the Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, for the Years ending August, 1842, 1843, and 1844. 8vo.—*From the Society.*

Annales des Mines. Quatrième Série. Tome VI. V^e et VIe Livraisons de 1844. 8vo.—*From the Engineers of Mines.*

Journal Asiatique, ou Recueil de Mémoires d'Extraits et de Notices Relatifs à l'Histoire, à la Philosophie, aux Langues et à la Littérature des Peuples Orientaux. Quatrième Série. Tome IV. No. 20. Décembre, 1844. Tome V. Nos. 21 à 23. 1845. 8vo.—*From the Society.*

Bulletin de la Société de Géographie. Troisième Série. Tome Deuxième. Paris, 1844. 8vo.—*From the Society.*

Report of the Fourteenth Meeting of the British Association for the Advancement of Science; held at York, in September, 1844. London, 1845. 8vo.—*From the Association.*

Account of the Northumberland Equatoreal and Dome, attached to the Cambridge Observatory. By G. R. Airy, Esq., M.A., Astronomer Royal. Cambridge, 1844. 4to.—*From H. G., the Duke of Northumberland.*

The African Repository and Colonial Journal. Vol. XXI. September, 1845. No. 9. 8vo.—*From the American Colonization Society.*

The Medical News and Library. Vol. III. September, 1845. No. 33. 8vo.—*From Messrs. Lea & Blanchard.*

Journal of the Franklin Institute of the State of Pennsylvania. Vol. X. September, 1845. 8vo.—*From Dr. R. M. Patterson.*

On the Liquefaction and Solidification of Bodies generally existing as Gases. By Michael Faraday, Esq., F.R.S. From the Philosophical Transactions. Part 1, for 1845. London, 1845. 4to. *From the Author.*

The Electrical Magazine. Conducted by Mr. Charles V. Walker. Vol. II. No. 9. July, 1845. 8vo.—*From the Editor.*

On the Transport of Erratic Blocks. By William Hopkins, M.A., F.R.S., &c. From the Transactions of the Cambridge Philosophical Society. Vol. VIII. Part 2. 4to.—*From the Author.*

Four Letters on the Motion of Glaciers. By William Hopkins, Esq., &c. From the London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science. Vol. XXVI. London, 1845. 8vo.—*From the Author.*

Bulletin Polytechnique, Revue des Sciences Exactes, de leurs applications et de leur Enseignement, etc. etc. Par Auguste Blum et autres. Tome 1ᵉʳ. No. 1. Janvier, 1845. 8vo.—*From D. B. Warden, Esq.*

The American Journal of Science and Arts. Conducted by Prof. Silliman and Benjamin Silliman, Jr. Vol. XLIX. No. 1. July, 1845. 8vo.—*From the Editors.*

Report of the Secretary of the Navy, communicating a Report of the Plan and Construction of the Depôt of Charts and Instruments, with a Description of the Instruments, &c. February 18, 1845. Read to Senate. 28th Congress, 2d Session. Doc. No. 114. 8vo.—*From Lieut. Gilliss.*

The Principles of the Differential and Integral Calculus; and their

application to Geometry. By Washington M'Cartney, Esq. Philadelphia, 1844. 8vo.—*From the Author.*

Histoire Naturelle des Poissons. Par M. le Baron Cuvier et M.A. Valenciennes. Tome Dix-septième. Paris 1844. 4to. Blanches. No. 456 à 487.

Annales de Chimie et de Physique. Troisième Série. Année 1844–5. Tomes X. XI. XII. XIII. XIV. No. for May. 8vo.

Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences. Tome XX. Nos. 1 to 24, inclusive. Paris, 1845. 4to.

Astronomische Nachrichten. Nos. 542, 543, 544. 4to.

The Committee to whom was referred Mr. M'Ilvaine's Memoir upon a New Civil and Ecclesiastical Calendar, reported in favour of its publication in the Transactions, which, upon motion of Mr. Kane, was ordered accordingly.

Mr. M'Ilvaine's Calendar consists of a central column headed " Eras," accompanied by two series of secular equations, by means of which, and of two small ancillary tables, he has been enabled to reduce to identical terms, his formulæ for finding in both styles and through a vast range of time, the day of the week in the Civil Calendar, and the Annual Epact, with Easter deduced from it, in the Ecclesiastical. After noticing the simplifications of the Calendar, effected within the last half century by the analytical methods of Gauss and Delambre, Mr. M'Ilvaine proceeds to demonstrate the rule of his own Civil Calendar, and to explain the principles upon which Table B, containing numbers for the respective months, was formed. Having thus proved that no necessity exists for the use of Dominical letters in the Julian Calendar, since the same object may be attained in an easier way through the Solar Equation 5, standing in column A, opposite to the Julian Era, he goes on to show that, with the aid of table B, a similar device may be equally well adapted to the Gregorian Era.

The first step in the reformation of the Julian Calendar, in 1582, consisted in the suppression of 10 days in that year, by calling the day, which, in the old style, was the 5th of October, the 15th of October in the new. Now the Julian 5th of October, 1582, will be shown by the Calendar to have been Friday, and the 15th, conse-

quently, Monday; and, as the series of days of the week was not in-
terrupted, nor intended to be, by the reform, in order to make the
15th of October, in the new style, coincide with Friday, it is obvious
that we must go back three days; that is, we must subtract 3 from
the Julian Solar Equation 5, leaving 2, which will thus become the
Gregorian Solar Equation for the remainder of the 16th century.
This equation would suit all succeeding centuries, were it not for
the second step taken at the reformation, of directing that after 1600,
which continued bissextile in both Calendars, every succeeding hun-
dredth year, whose centurial figures were not divisible by four, with-
out a remainder, should cease to be leap years.

As each of the years, 1700, 1800, and 1900, loses consequently a
day, the number expressive of the solar equation is diminished by
one at each change of the centurial figure; but for 2000, and for
every succeeding 400th year, whose centurial figures are divisible
by four without a remainder, the equation continues, like that of
1600, the same as the preceding one, and these years only are
marked on the civil side of the column of Eras with an asterisk.

Thus column A, consisting of fewer figures (and these symmetri-
cally disposed in a cycle of 7,) than have ever been used in con-
structing any table of Dominical letters for *either* style, completes a
Civil Calendar of simple form, and unlimited extent.   In the present
century, whose solar equation is 0, the computation will be found
particularly easy.

Mr. M'Ilvaine then proceeds to explain the construction of the Ec-
clesiastical side of his Calendar, and the means which he adopted
for connecting it with Table B of the other side, as well as for mak-
ing a single additional column C, serve as a convenient substitute for
the Extended Table of Epacts now in use.

From the descriptions given in Mr. Galloway's article on the Calen-
dar, in the seventh edition of the Encyclopedia Britannica, and in one,
by Lord Macclesfield, published in the Philosophical Transactions for
1750, Mr. M'Ilvaine inferred, that the golden numbers, as *remain-
ders,* on division by 19 of the year plus 1, might be dispensed with,
and their place, in computation, conveniently supplied by adding to
11 times the year, the 19th part of the year used as a *quotient,* or
whole number, (taking care only that when the year happens to be
a multiple of 19, one less than the 19th part shall be added,) and then
rejecting thirties from the sum.   This easy formula, equivalent to the
rule at the head of the tablet, yielded him, without a failure, the con-
stantly recurring 19 epacts that mark the Julian Calendar.   Now

PERPETUAL CALENDAR,

CIVIL   AND   ECCLESIASTICAL,

Freed from Dominical Letters, Solar Cycle, Golden Numbers, Extended Tables of Epacts and Algebraic Formulæ. By Wm. M·Ilvaine, Burlington, N. J. 1844.

RULE.

To find on what day of the week a given day of the Month falls in any Year after CHRIST, to the end of Time.

Add to the Year
     its **4**th part (omitting fractions),
     the Eq. in col. **A** beside the Era,
     the No. of the Month in Table **B**,
     and the Day of the Month.
(or the excess over 7s in the Day of the Mo.)

Divide the Sum by 7,

The Excess over **7**s, calling **0** always **7**, will be the D**a**y sought, viz.

The **1**st, **2**d, **3**d, **4**th, **5**th, **6**th, **7**th,

Being **Su. M. Tu. W. Th. Fr. S.**

Except in January and February of Leap Y'rs, when the *preceding* will be the true day.

All JULIAN Years full **4**s are Leap Years. GREGORIAN full **4**s are also Leap Years, *unless* their two right hand figs. be **00** joined with left hand figs. not full **4**s.

TABLE B.
Of Months.

1st Quarter Jan.	0	Feb. 3	3	Mar.
2d ,, April.	6	1	4	June.
3d ,, July.	6	2	5	Sept.
4th ,, Oct.	0	3	5	Dec.

Nov.

The No. for *each* Month in Table **B.** is the number of days beyond full weeks in *all* the Months which precede it from the beginning of a Common Year.

The order and position of the figs. **3, 6, 5,** (the number of days in a Common Year,) and of **1, 2, 3, 4, 5,** in the space between them, may recall to memory the whole Table.

ERAS

Solar Equation. (**A**)	ERAS	Lunisolar Equation. (**C**)
5	Julian. After Christ.	0
	Grego-rian, From 1582. Centurial Figures.	
2	15	1
2	*16	1
1	17	0
0	18 *	0
6	19	29
6	*20	29
5	21 *	29
4	22	28
3	23	27
3	*24 *	28
2	25	27
1	26	26
0	27 *	26
0	*28	26
6	29	25
5	30 *	25
4	31	25
4	*32	24
3	33 *	24
2	34	23
1	35	22
1	*36 *	23
0	37	22
6	38	21
5	39 *	21
5	*40	21
4	41	20
4	42	19
2	43 *	19
2	*44	19
1	45	18
0	46 *	18
6	47	17
6	*48	17
5	49 *	17
5	50	16
4	51	15
3	*52 *	16
3	53	15
2	54	14
1	55 *	14
0	*56	14
6	57	13
5	58 *	13
4	59	12
4	*60	12
3	61 *	12
2	62	11
1	63	10
1	*64 *	11

RULE.

To find the Calendar-Moon's Age on the 1st ·day of January in any Year, from the beginning of the CHRISTIAN ERA.

Add to ten times the Year,
     the Year,
     † its **19**th part (omitting fractions),
     and the Eq. in col. **C,** beside the Era.
† (But if no fraction add 1 less than the 19th part.)

Divide the sum by 30,

The Excess over **30**s, calling **0 = 30,** will be the Age sought, or *Annual Epact*.

To find EASTER,

Subtract any

EPACT,

Gregorian.		Julian.		The Diff. will be the DAY of the MONTH on which occurs the PASCHAL TERM.
Between	From	Between	From	
1 & 12	**13**	1 & 4	**5**	in April.
13 & 23	**44**	5 & 15	**36**	in March.
†25 & 30	**43**	17 & 28	**35**	⎫ ⎬ in April.
24	**42**	29	**34**	⎭

† 25 also from 42, if in getting a 19th of the year, the Rem. exceed 10.

—— This is the Epact 25' of the Tables in the Article "Calendar." Encyclopedia Britannica, 7th Edition.

Then find by the CIVIL CALENDAR the Day of the Week on which *that* Day of the Month falls, and the following Sunday will be EASTER SUNDAY.

The number of days to be counted forwards will be shown by subtracting *the Day of the Week* thus found, from 8.

EXAMPLES.

What Day of the Week was April 2d, A. D. 326.	Required Easter, A. D. 326.	What Day of the Week will be March 22d, A. D. 1845.	Required Easter, A. D. 1845.
4) 326	3260	4) 1845	18450
81	19) 326	461	19) 1845
A 5	17	**A** 0	97
Mo. 6	**C** 0	Mo. 3	**C** 0
Day 2			
			30) 20392
7) 420	30) 3603	Day 22	679
60	120		
		7) 2331	*Epact* 22
Remainder 0	*Rem. or Epact* 3	333	*From* **44**
or 7	*Taken from* **5**		
		Remainder 0	**Term** *March* 22
Answer, Sat.	**Term** *April* 2	*or* 7	
		Answer, Sat.	
Thence	*to Sunday* 1	*thence*	*to Sunday* 1
	Ans. April 3		*Ans. March* 23

Rule proved by examples from De Morgan.
See British Almanac and Companion for 1845.

Julian Yr.	**Easter.**	**Gregorian Yr.**	**Easter.**
4) 1639	16390	4) 4610	46100
409	19) 1639	1152	19) 4610
A 5	86	**A** 0	242
Mo. 6	**C** 0	Mo. 6	**C** 18
Day 10		Day 13	
	30) 18115		30) 50970
7) 2069 Rr.	Epact 25	7) 5781 Rr.	Epact 30
Wed'y. 4	From **35**	Friday 6	From **43**
From 8	**Term** April 10	From 8	**Term** April 13
	4 . . to Sunday 4		2 . . to Sunday 2
Same Answer, April 14		Same Answer, April 15	

Rule proved by examples from Delambre.
See Conn. des Tems for 1817, and Hist. de l'Astron. Mod.

Julian Yr.	**Easter.**	**Gregorian Yr.**	**Easter.**
4) 4763	47630	4) 3909	39090
1190	19) 4763	977	19) 3909
A 5	250	**A** 5	205
Mo. 6	**C** 0	Mo. 6	**C** 21
Day 12		Day 17	
	30) 52643		30) 43225
7) 5976 Rr.	Epact 23	7) 4914 Rr.	Epact 25'
Thursday 5	From **35**	Sat. 0 = 7	From **42**
From 8	**Term** April 12	From 8	**Term** April 17
	3 . . to Sunday 3		1 . . to Sunday 1
Same Answer, April 15		Same Answer, April 18	

obtaining in this way the Julian epact for 1582, and advancing the epacts by a unit, which is equivalent to the tabular arrangements made at the transition to the Gregorian Calendar in that year, the first equation of column C becomes 1. From this the succeeding equations of that column were derived, as follows: Every centurial figure, at which, in successive periods of 25 centuries, (beginning at 1800, 4300, 6800, &c.,) the epact is, according to the Gregorian law, to be increased by a unit—a correction which occurs at the end of every 300 years, seven times in succession, and then once at the end of 400 years (making 8 corrections in the course of 2500 years)— was marked with an asterisk. Then descending, century by century, in the central column of eras, the equation in column C was kept the *same*, wherever an asterisk is met with on *either* side. The last equation was *diminished* by 1 whenever there was *no* asterisk, and *increased* by 1 whenever the asterisk appeared on *both sides*, limiting the series by the cycle of 30, and considering 30 as always equivalent to 0.

The epacts obtained by means of the table thus formed, and the rule, Mr. M'Ilvaine found to be in exact correspondence with those set down in the Extended Tables of Epacts given in the ordinary treatises upon the Calendar.

Mr. M'Ilvaine then explains his method of obtaining, in the table for finding Easter, *four* fixed numbers in each Calendar, by means of which he arrives at once at the Paschal term, or day of the month in March or April, on which Easter Sunday depends. The day of the week corresponding to this is then to be found by the Civil Calendar, and the succeeding Sunday is, of course, Easter Sunday.

Mr. Kane announced to the Society the death of the Honourable Joseph Story, who died at Cambridge, Mass., on Wednesday, 10th September, 1845, in the 65th year of his age.

On motion of Mr Kane, Mr. William Rawle was appointed to prepare a necrological notice of Judge Story.

Mr. T. I. Wharton, from the Committee on the Claim of the executors of the late Mr. Nathan Dunn, reported.

On motion of Dr. Patterson, the Committee was continued without being required to report until specially ordered.